May 27th, 2022

KEY TAKEAWAYS

- Omicron subvariant BA.2.12.1 is very likely dominant in Virginia, bringing with it a higher effective transmission rate than BA.2.
- 92 of Virginia's 133 localities are at medium or high CDC community levels, including 27 at high. Masking in indoor public places is recommended at high community levels.
- All of Virginia's 35 health districts are in growth trajectories, including 30 in surge trajectories.
- Current projections show that BA.2.12.1 may cause peak hospital admissions (in August) slightly exceeding those experienced last January. Shortened lengths of stay may ameliorate the burden on hospitals. The modeling team is closely monitoring COVID-19 hospitalization rates and lengths of stay to assess potential burden.

39.3 per 100k
Average Daily Cases
Week Ending May 23rd, 2022

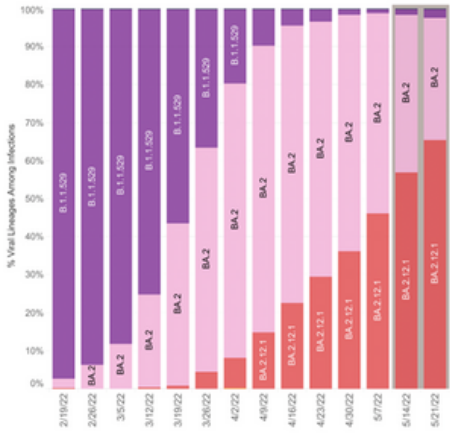
(187 per 100k)
Average Daily Case Peak
on January 16th, 2022

27 / 65 / 41
Virginia Localities at
High / Medium / Low
CDC Community Levels
May 26, 2022

5 / 76 / 52
Virginia Localities at
High / Medium / Low
CDC Community Levels
May 19, 2022

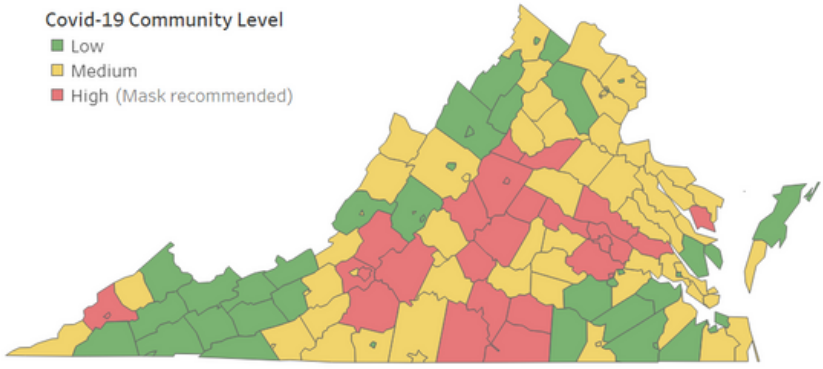
KEY FIGURES

Variant Mix -HHS Region 3



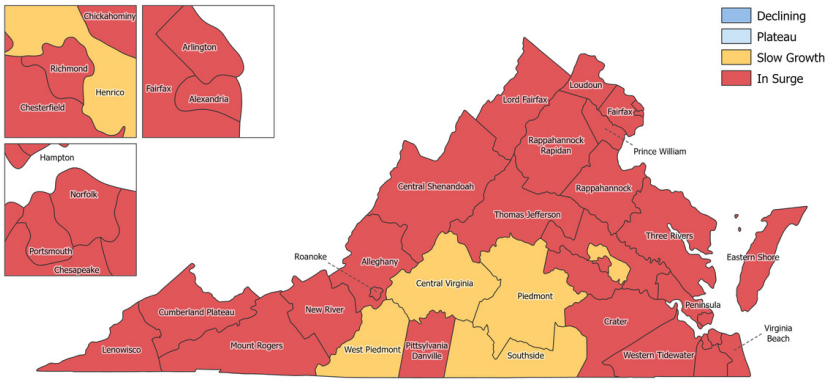
CDC Community Levels

As of May 26



Growth Trajectories: 30 Health Districts in Surge

Status	# Districts (prev week)
Declining	0 (0)
Plateau	0 (4)
Slow Growth	5 (7)
In Surge	30 (24)



UNIVERSITY of VIRGINIA
BIOCOMPLEXITY INSTITUTE

UVA COVID-19 MODEL WEEKLY UPDATE

VDH VIRGINIA DEPARTMENT OF HEALTH

THE MODEL

The UVA COVID-19 Model and weekly results are provided by the UVA Biocomplexity Institute, which has over 20 years of experience crafting and analyzing infectious disease models. It is a health district-level **S**usceptible, **E**xposed, **I**nfected, **R**ecovered (SEIR) model designed to evaluate policy options and provide projections of future cases based on the current course of the pandemic. The Institute is also able to model alternative scenarios to estimate the impact of changing health behaviors and state policy.

COVID-19 is a novel virus, and the variant mix changes periodically. These models improve as we learn more.

THE SCENARIOS

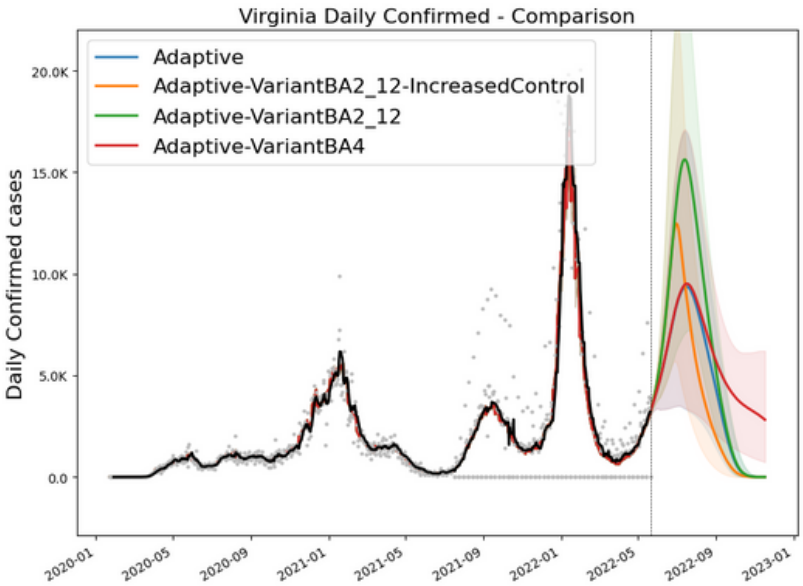
Updated: The model uses scenarios to explore the potential paths the pandemic may take under different conditions. Model projections take a variety of factors into account, including current variants, vaccine uptake, vaccination rates (including boosters), previous infection, waning immunity, weather, and behavioral responses (e.g., mask-wearing, social distancing). The "**Adaptive**" scenario represents the current course of the pandemic, projecting it forward with no major changes. The new "**Adaptive-VariantBA2_12**" scenario adjusts for the BA.2.12.1 subvariant's greater transmissibility (30% more than BA.2). It assumes BA.2.12.1 becomes dominant by June and reaches 95% prevalence by July, taking over from the older BA.2. The new "**Adaptive-VariantBA2_12-IncreasedControl**" scenario adds increased prevention and seasonality to the "Adaptive-VariantBA2_12" scenario. These include increased home testing, masking, and self-isolation when sick. This scenario explores the potential public response to a new summer surge. It assumes that these interventions will have a 25% reduction in community transmission and starts in 30 days. The new **Adaptive-VariantBA4** scenario is speculative. It models the hypothetical introduction of the BA.4 subvariant now circulating in South Africa. It assumes that BA.4 is 30% better at escaping prior immunity than BA.2, and becomes dominant by October. Note that at the time of this writing BA.4 represents fewer than 1% of cases of BA.4 in Virginia. This scenario is purely a "*what if*" hypothetical.

MODEL RESULTS

Updated: The current course "**Adaptive**" scenario is shown in blue. It projects a slow but steady rise, reaching 30,000 weekly cases by June and peaking at 65,000 weekly cases in mid-July.

The "**Adaptive-VariantBA2_12**" scenario, shown in green, projects a larger surge. It projects a rise to 60,000 weekly cases by mid-June and peaks at 105,000 weekly cases in the middle of July. The "**Adaptive-VariantBA2_12-IncreasedControl**" scenario is shown in orange. It is identical to "Adaptive-VariantBA2_12" until June 1st. From there, rates quickly peak at 85,000 weekly cases in early July, before falling back below 40,000 by August. The "**Adaptive-VariantBA4**" scenario (red) is very similar to the current "Adaptive" scenario, but the post-peak decline in case-rates is much slower. In this scenario, weekly cases remain above 20,000 until November.

Please do your part to drive down cases. Always practice good prevention. Consider masking in indoor public areas and self-isolating when sick. Also please get vaccinated and boosted.



Date of Latest Model Run: 2022-05-25
Date of Next Model Run: 2022-06-08

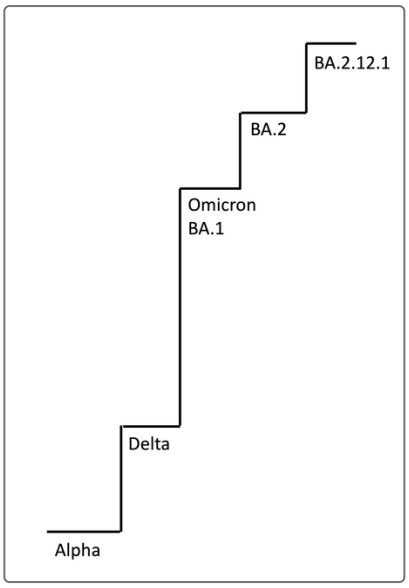
Please note: The data and projections shown here reflect reported cases. During the Omicron wave, testing shortages resulted in far fewer infections being reported as cases. Therefore, despite appearances, we expect fewer total infections than we experienced in January. See page three of the May 13th modeling report for more details.

TRANSMISSIBILITY

According to the CDC's Nowcast, the BA.2.12.1 subvariant of the Omicron variant is dominant in HHS Region 3, projected to make up about two-thirds of cases submitted for sequencing during the week ending on May 21. The UVA Biocomplexity Institute provides a separate variant forecast for Virginia. This forecast, which uses a different methodology, also estimates that BA.2.12.1 is dominant in Virginia. These estimates need to be confirmed as hard data comes in, but BA.2.12.1 is likely dominant in Virginia.

Each variant and subvariant of COVID-19 that has become dominant in the United States has had a higher effective reproduction rate than its predecessors. The effective reproduction rate is the actual rate of transmission measured in the community, while the natural reproduction rate is the rate expected in an immunologically naive population. The effective reproduction rate is mitigated by prevention measures, and by immunity provided by previous infection or vaccination.

Viruses can evolve to increase their natural reproduction rate, or to increase their effective reproduction rate by getting around these protections. Omicron did both. It decreased its latency period, decreasing the turnaround time for new infections, and was better at evading immunity than the Delta variant. As a result, its effective reproduction rate was an estimated three times higher than Delta's. Other factors may have been involved as well. Omicron's subvariants have continued this trend, though they have fortunately not made the jump Omicron did.



This figure illustrates the increased transmissibility of dominant COVID-19 variants and subvariants. Omicron was a game-changer. Source: Eric Topol, Ground Truths Substack.

Severity

Similar to transmissibility, COVID-19 variants and subvariants can have both a natural and an effective virulence (severity). Several factors make it difficult to compare the natural virulence of variants. However, we know the huge surge in cases caused by Omicron did not result in a proportionate surge in hospitalizations and deaths. In other words, effective virulence was reduced during the Omicron wave. Researchers are still trying to sort out to what degree this was caused by reduced natural variance, or by factors such as immunity caused by vaccines or previous infection, new treatments, or prevention efforts like masking. But it is clear that vaccination and boosters play a huge role. Those with up-to-date vaccinations have the most protection. One study found boosted individuals 70% reduction in risk of hospitalization or death from an Omicron infection.

Modeling Hospitalizations

Prior to Omicron, the relationship between COVID-19 infections and hospitalizations was reliably stable, making it easier to project hospitalizations. As effective virulence decreased with the Omicron wave that relationship diverged, making it more difficult to project the threat of successive variants to hospitals. The UVA Biocomplexity Institute has been making adjustments to their model on-the-fly using the most recent hospitalization data and evidence from other countries and states affected by variants before Virginia. In addition to the number of hospitalizations, the team produces length-of-stay estimates. While no forecast is perfect, these methods have provided reasonably good warnings of the impact of successive waves on hospitals.

Current projections show that peak daily hospitalizations could slightly exceed the January wave as BA.2.12.1 becomes dominant. Reduced effective virulence, however, also comes with shorter hospital stays in many instances. Shorter lengths of stay could result in a lower overall burden on hospitals. New treatments for at-risk individuals are also having an impact.

The most important lesson about virulence, however, is that, despite breakthrough cases, reinfections, and higher effective reproduction rates, Virginia' health is still in our hands. Vaccination is our best defense against severe outcomes from COVID-19. Get vaccinated and boosted when eligible. Keep abreast of the CDC community level in your community, and follow applicable guidelines. Currently, 41 of Virginia's 133 localities are at high community levels (see page 1). Masking in indoor public places is recommended in these communities. Masking is recommended for high risk individuals in localities at medium community levels.